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noted, but occasionally a conspicuous bipolar spindle was seen. *Calycularia* therefore seems to be a suitable form for settling the FARMER-MOORE controversy, and it is greatly to be regretted that CAMPBELL's material is so scanty. He thinks that *Calycularia radiculosa* should be made the type of a new genus intermediate between *Mörkia* and forms like *Makinoo* or *Pellia*.—W. J. G. LAND.

Embryo sac of *Aglaonema*.—CAMPBELL¹⁰ has published a further study of the embryo sac and embryo of *Aglaonema*, the species investigated being *A. simplex* and *A. modestum*. Among the results are the following: the primary sporogenous cell develops the embryo sac directly; the first divisions in the embryo sac result in four free nuclei arranged in pairs, and only one of the micropylar nuclei divides, producing the synergids, the other without division becoming the egg nucleus; there is no nuclear fusion preceding endosperm formation and there are no definite antipodal cells; no evidence of fertilization was seen; the sac becomes filled with endosperm tissue; in embryo-formation the synergids remain intact, "and it sometimes looks as if they also contributed to the tissues of the embryo"; the embryo finally completely fills the sac, the body regions being differentiated at a late stage in the development.—J. M. C.

Sex in *Onoclea*.—Miss WUIST¹¹ has used *Onoclea Struthiopteris* in an investigation to determine whether the sex of the dioecious gametophytes is predetermined in the spore. Soil and solution cultures were employed, also different intensities of insolation. The work has extended through several years, so that the results are well established, the fundamental one being that the sex of the gametophyte is not predetermined in the spore. It was shown that the gametophyte is either monoecious or apparently dioecious according to its age and environment; for example, in younger cultures in soil 5 per cent of all the gametophytes were monoecious; in older cultures 15 per cent were monoecious. A striking result was that 90 per cent of the gametophytes which originally bore archegonia were induced later, by "favorable conditions of nutrition," to produce antheridia; while 5 per cent of the gametophytes which originally bore antheridia were induced later to produce archegonia. The "male tendency" appeared to be latent in all parts of the apparently female gametophyte. The effect of various cultures and the incidental responses of various kinds are very suggestive.—J. M. C.

¹⁰ CAMPBELL, D. H., The embryo sac of *Aglaonema*. Scottish Bot. Review 1:110-115. pls. 1-4. 1912.

¹¹ WUIST, ELIZABETH DOROTHY, Sex and development of the gametophyte of *Onoclea Struthiopteris*. Physiol. Researches 1:93-132. figs. 15. 1913.